Growth Potential Of Listeria Monocytogenes On Cantaloupe (Cucumis Melo) Pulp Evaluation Under A Dynamic Time-temperature Profile

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Aim:

The pupose of this study was to evaluate the temperature influence on the Growth Potential (δ) of *L. monocytogenes* during storage. A simulation of real cold chain scenario with refrigeration and abuse temperatures was applied in order to identify possible critial storage conditions.

Method:

Cantaloupe Sample:

Whole melons were sourced by a major UK supplier. The cantaloupes on arrival at the laboratory were stored at 4°C until the use. The day of the trial, they were leaved at room temperature (approximately 20°C) for at least 2 hours before washing and cutting.

Bacterial Strain:

Listeria monocytogenes (NCTC 11 994) was obtained from National Collection of Type Cultures (NCTC). Prior to the experiment the freeze dried bacterial culture was streaked onto Tryptone Soya Agar (TSA) and incubated at 37°C for 24 ± 2 hours. Isolated colonies were picked and transferred into Tryptone Soya Broth (TSB), then incubated at 37°C for 24 ± 2 hours.

Background:

Although ready-to-eat (RTE) fruits and vegetables are a healthy and convenience food choice, they have in most recent years been associated with several foodborne outbreaks [10]. Several bacteria pathogens have been implicated in such outbreaks however *Listeria monocytogenes* is reported to have a higher case-fatality rate compared to *Salmonella* and Escherichia coli [2]. A recent case that was reported involving *Listeria* was relating to consumption of contaminated cantaloupe which led to the death of two people. *Listeria* is ubiquitous in the

environment, hence contamination of fresh produce such as melons could occur in field where the outer rind of melons, especially the irregular rough rind of cantaloupe, aids the adhesion of soil and microorganisms [8, 9]. Further, this netted surfaces makes the removal of the pathogens more challenging compared to other kinds of melon [1, 11].

Whereby the pulp of melon initially free from pathogens, it can be contaminated by cross-contamination during cutting if the sanitation procedure on whole cantaloupe does not work properly [5]. Subsequently, the pH (5.2-6.7), water activity

Growth potential (δ):

The Growth Potential (δ) is defined as the different between the final microbial pupulation and the initial microbial population enumerated in a product.

In this study, the parameter was calculated as the difference between the Log(CFU/g) at the end of the trial and the Log(CFU/g) at the beginning of the trial as well as between the Log (CFU/g) for each single day and the Log(CFU/g) at the beginning of the trial.

Growth Potential (δ) could be used to classify the food as RTE that is able to support the growth of L. monocytogenes (> 0.5 log10 cfu/g) or RTE unable to support the growth of L. monocytogenes (≤ 0.5 log10 cfu/g) [3].

Results and Conclusion:

The initial level of *L. monocytogenes* was 5.7 Log(CFU/g).

Two time-temperature scenarios (4°C for 24 h then 8°C or 12°C for 48h) were assessed and the trial was repeated three times. The average δ after 24h at 4°C resulted 0, 0.9 after only 24h at 8°C and 1 after 48h. The δ after 24h at 12°C resulted 1.6 and 1.7 after 48h.

The results show that the temperature has a fundamental impact on δ. Indeed, in only 24h of abuse of temperature the δ increased by 1 point changing the denomination of the product from non-supporting to supporting the growth of *Listeria*.

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